What is claimed is:

1. A process for detecting trace quantities of an anion in the presence of an excess of another anion in a liquid sample, the process comprising:

(a) loading a liquid sample comprising the anion of interest and an excess of another anion onto means selected from the group consisting of a concentrator and a sample loop by flowing the liquid sample there through in a first direction;

(b) reversing the direction of flow through the means to form an eluent stream; and

(c) flowing the eluent stream into a mass spectrometer adapted to accept said eluent, and using the mass spectrometer for detecting anion of interest.

2. Process in accordance with claim 1 wherein the anion of interest is selected from the group consisting of chloride ion, chlorite ion, chlorate ion, perchlorate ion, bromide ion, bromate ion, fluoride ion, nitrite ion, nitrate ion, sulfate ion, sulfite ion, chromate ion, iodide ion, borate ion, phosphate ion, polyphosphate ions, thiocyanate ion, thiosulfate ion, selenate ion, selenite ion, tungstate ion, arsenate ion, and anions of organic acids.

3. Process in accordance with claim 1 wherein the liquid sample is selected from the group consisting of strong acids, weak acids, salts of strong acids, and salts of weak acids.

4. Process in accordance with claim 1 wherein a plurality of anions of interest are identified in a single liquid sample.

5. Process in accordance with claim 1 wherein steps a, b, and c, are accomplished using a six-port valve.

6. An apparatus for detecting trace quantities of an anion in the presence of an excess of another anion in a liquid sample, the apparatus comprising:

(a) means for loading a liquid sample comprising the anion of interest and an excess of another anion onto a device selected from the group consisting of a concentrator and a sample loop;

(b) means for reversing flow through said device, thereby creating an eluent flow; and

(c) a mass spectrometer adapted to accept said eluent flow, and thereafter used to detect said anion of interest.

7. Apparatus in accordance with claim 6 wherein said means for loading is selected from the group consisting of a pump, an autosampler, a pressurized vessel, a syringe, a vacuum applied at an exit end of the concentrator or sample loop, and combinations thereof, and said means for reversing comprises a manifold.

8. Apparatus in accordance with claim 7 wherein said manifold comprises multiple ports.

9. Apparatus in accordance with claim 8 wherein said manifold is a six-port valve that may be moved between two positions; wherein a first port directs sample flow between the concentrator and a waste port; a second port directs flow either of said sample to said concentrator, or from said concentrator to said mass spectrometer; a third port directs flow of liquids either from the pump or from the concentrator to the mass spectrometer; a fourth port directs flow either to the mass spectrometer or the concentrator; a fifth port directs flow to waste or to the concentrator; and a sixth port directs flow to waste, either from the sample container or from the concentrator.

10. A process for detecting trace quantities of an anion of interest in the presence of an excess of another anion in a liquid sample, the process comprising:

(a) loading a liquid sample comprising the anion of interest and an excess of another anion onto a sample loop;

(b) moving the liquid sample through the sample loop through a first separator, creating a first eluent stream;

(c) (i) routing the stream to waste if excess anion is present and (ii) if the anion(s) of interest is (are) present, routing the first eluent stream to a first anion suppressor and creating a first anion-suppressor effluent;

(d) flowing the first anion-suppressor effluent to a concentrator for trapping the anion of interest;

(e) aligning the concentrator with a second separator and reversing flow through said concentrator to produce a concentrator effluent;

(f) flowing the concentrator effluent through the second separator to create a second eluent stream;

(g) routing the second eluent stream through a second anion suppressor and creating a second anion-suppressor effluent; and

(h) routing the second anion-suppressor effluent through a mass spectrometer adapted to accept the second anion-suppressor effluent, and using the mass spectrometer for detecting the anion of interest.

11. Process in accordance with claim 10 wherein steps (a) – (h) are accomplished using four six-port valves.

12. Process in accordance with claim 10 wherein steps (a) – (h) are controlled by a computer.

13. Process in accordance with claim 10 wherein step (a) is accomplished using means selected from the group consisting of a pump, an autosampler, a pressurized vessel, a syringe, a vacuum-generating device, and combinations thereof.

14. Process in accordance with claim 13 wherein the pressurized gas is an inert gas.

15. Process in accordance with claim 14 wherein the inert gas selected from the group consisting of helium, nitrogen, and mixtures thereof.

16. Process in accordance with claim 10 wherein the liquid sample is selected from the group consisting of strong acids, weak acids, salts of strong acids, and salts of weak acids.

17. Process in accordance with claim 10 wherein prior to step (a) – (h), a portion of the liquid sample is loaded onto the sample loop and pushed through the sample loop, the first separator, a third anion suppressor, and an ion detector, thereby establishing timing when the anion of interest and the excess anion will leave the first separator.

18. An apparatus for detecting trace quantities of an anion in the presence of an excess of another anion in a liquid sample, the apparatus comprising:

(a) a sample loop having a first end adapted to be connected to a first connection selected from the group consisting of a sample-injection device and a first pump, and a second end adapted to be connected to a second connection selected from the group consisting of an inlet of a first separator and a waste port;

(b) said first separator having an outlet connection adapted to be connected to a connection selected from the group consisting of a second waste port and an inlet of a first anion suppressor;

(c) said first anion suppressor having an inlet connection adapted to be connected to a connection selected from the group consisting of a second pump and the outlet connection of the first separator, and an outlet connection adapted to be selected from the group consisting of an inlet of a concentrator and a third waste port;

(d) the concentrator having an inlet connection adapted to be connected to a connection selected from the group consisting of an inlet of a second separator or the outlet of the first anion suppressor, and an outlet connection adapted to be selected from the group consisting of a fourth waste port or a third pump;

(e) the second separator having an inlet connection adapted to be connected to a connection selected from the group consisting of the third pump or the concentrator inlet, and an outlet connection adapted to be connected to an inlet of a second anion suppressor, the second anion suppressor having an outlet connection; and

(f) the outlet connection of said second anion suppressor adapted to be connected to a mass spectrometer adapted to accept an effluent from the outlet of the second anion suppressor, and thereafter used to detect the anion of interest.

19. Apparatus in accordance with claim 18 wherein the sample-injection device, and the sample-loop first and second ends are each connected to a first six-port valve.

20. Apparatus in accordance with claim 19 wherein the inlet of the first separator is connected to said first six-port valve.

21. Apparatus in accordance with claim 18 wherein the connections in parts (b) and (c) are made through a second six-port valve.

22. Apparatus in accordance with claim 18 wherein the connections in parts (d) and (e) are made through third and fourth six-port valves.

23. A process for quantifying trace quantities of an anion in the presence of an excess of another anion in a liquid sample, the process comprising:

(a) loading a liquid sample comprising the anion of interest and an excess of another anion onto means selected from the group consisting of a concentrator and a sample loop by flowing the liquid sample there through in a first direction;

(b) reversing the direction of flow through said means to form an eluent stream; and

(c) flowing the eluent stream into a mass spectrometer adapted to accept the eluent stream, and using the mass spectrometer for quantifying the anion of interest.

24. An apparatus for quantifying trace quantities of an anion in the presence of an excess of another anion in a liquid sample, the apparatus comprising:

(a) means for loading a liquid sample comprising the anion of interest and an excess of another anion onto a device selected form the group consisting of a concentrator and a sample loop;

(b) means for reversing flow through said device and creating an eluent flow; and

(c) a mass spectrometer adapted to accept said eluent flow, and thereafter used to quantify said anion of interest.

25. A process for quantifying trace quantities of an anion of interest in the presence of an excess of another anion in a liquid sample, the process comprising;

(a) loading a liquid sample comprising the anion of interest and an excess of another anion onto a sample loop;

(b) moving the liquid sample through the sample loop through a first separator, creating a first eluent stream;

(c) (i) routing the stream to waste if excess anion is present and (ii) if the anion(s) of interest is (are) present, routing the first eluent stream to a first anion suppressor and creating a first anion-suppressor effluent;

(d) flowing the first anion-suppressor effluent to a concentrator for trapping the anion of interest;

(e) aligning the concentrator with a second separator and reversing flow through the concentrator to produce a concentrator effluent;

(f) flowing the concentrator effluent through the second separator to create a second eluent stream;

(g) routing the second eluent stream through a second anion suppressor and creating a second anion-suppressor effluent; and

(h) routing the second anion-suppressor effluent through a mass spectrometer adapted to accept the second anion-suppressor effluent, and using the mass spectrometer for quantifying the anion of interest.

26. Process in accordance with claim 25 wherein prior to step (a) – (h), a portion of the liquid sample is loaded onto the sample loop and pushed through the sample loop, the first separator, a third anion suppressor, and an ion detector, thereby establishing timing when the anion of interest and the excess anion will leave the first separator.

27. An apparatus for quantifying trace quantities of an anion in the presence of an excess of another anion in a liquid sample, the apparatus comprising:

(a) a sample loop having a first end adapted to be connected to a first connection selected from the group consisting of a sample-injection device and a first pump, and a second end adapted to be connected to a second connection selected from the group consisting of an inlet of a first separator and a waste port;

(b) said first separator having an outlet connection adapted to be connected to a connection selected from the group consisting of a second waste port and an inlet of a first anion suppressor;

(c) said first anion suppressor having an inlet connection adapted to be connected to a connection selected from the group consisting of a second pump and the outlet connection of the first separator, and an outlet connection adapted to be selected from the group consisting of an inlet of a concentrator and a third waste port;

(d) the concentrator having an inlet connection adapted to be connected to a connection selected from the group consisting of an inlet of a second separator or the outlet of the first anion suppressor, and an outlet connection adapted to be selected from the group consisting of a fourth waste port or a third pump;

(e) the second separator having an inlet connection adapted to be connected to a connection selected from the group consisting of the third pump or the concentrator inlet, and an outlet connection adapted to be connected to an inlet of a second anion suppressor, the second anion suppressor having an outlet connection; and

(f) the outlet connection of said second anion suppressor adapted to be connected to a mass spectrometer adapted to accept an effluent from the outlet of the second anion-suppressor and thereafter used to quantify the anion of interest.

28. A process for identifying an anion in the presence of an excess of another anion in a liquid sample, the process comprising:

(a) loading a liquid sample comprising the anion of interest and an excess of another anion onto means selected from the group consisting of a concentrator and a sample loop by flowing the liquid sample there through in a first direction;

(b) reversing the direction of flow through said means to form an eluent stream; and

(c) flowing the eluent stream into a mass spectrometer adapted to accept said eluent stream, and using the mass spectrometer for identifying the anion of interest.

29. An apparatus for identifying trace quantities of an anion in the presence of an excess of another anion in a liquid sample, the apparatus comprising:

(a) means for loading a liquid sample comprising the anion of interest and an excess of another anion onto a device selected from the group consisting of a concentrator and a sample loop;

(b) means for reversing flow through said device and creating an eluent flow; and

(c) a mass spectrometer adapted to accept said eluent flow, and thereafter used to identify said anion of interest.

30. A process for identifying trace quantities of an anion of interest in the presence of an excess of another anion in a liquid sample, the process comprising;

(a) loading a liquid sample comprising the anion of interest and an excess of another anion onto a sample loop;

(b) moving the liquid sample through the sample loop through a first separator, creating a first eluent stream;

(c) (i) routing the stream to waste if excess anion is present and (ii) if the anion(s) of interest is (are) present, routing the first eluent stream to a first anion suppressor and creating a first anion-suppressor effluent;

(d) flowing the first anion-suppressor effluent to a concentrator for trapping the anion of interest;

(e) aligning the concentrator with a second separator and reversing flow through said concentrator to produce a concentrator effluent;

(f) flowing the concentrator effluent through the second separator to create a second eluent stream;

(g) routing the second eluent stream through a second anion suppressor and creating a second anion-suppressor effluent; and

(h) routing the second anion-suppressor effluent through a mass spectrometer adapted to accept said second anion suppressor effluent, and using the mass spectrometer for identifying the anion of interest.

31. Process in accordance with claim 30 wherein prior to step (a) – (h), a portion of the liquid sample is loaded onto the sample loop and pushed through the sample loop, the first separator, a third anion suppressor, and an ion detector, thereby establishing timing when the anion of interest and excess anion will leave the first separator.

32. An apparatus for identifying trace quantities of an anion in the presence of an excess of another anion in a liquid sample, the apparatus comprising:

(a) a sample loop having a first end adapted to be connected to a first connection selected from the group consisting of a sample-injection device and a first pump, and a second end adapted to be connected to a second connection selected from the group consisting of an inlet of a first separator and a waste port;

(b) said first separator having an outlet connection adapted to be connected to a connection selected from the group consisting of a second waste port and an inlet of a first anion suppressor;

(c) said first anion suppressor having an inlet connection adapted to be connected to a connection selected from the group consisting of a second pump and the outlet connection of the first separator, and an outlet connection adapted to be selected from the group consisting of an inlet of a concentrator and a third waste port;

(d) the concentrator having an inlet connection adapted to be connected to a connection selected from the group consisting of an inlet of a second separator or the outlet of the first anion suppressor, and an outlet connection adapted to be selected from the group consisting of a fourth waste port or a third pump;

(e) the second separator having an inlet connection adapted to be connected to a connection selected from the group consisting of the third pump or the concentrator inlet, and an outlet connection adapted to be connected to an inlet of a second anion suppressor, the second anion suppressor having an outlet connection; and

(f) the outlet connection of said second anion suppressor adapted to be connected to a mass spectrometer adapted to accept an effluent from the second anion-suppressor outlet, and thereafter used to identify the anion of interest.